

Using GPS-Derived Heights as Constraints in Leveling Adjustments

Brief synopsis of the attached outline

Section 1: To generate leveling-based, adjusted heights constrained to Height Modernization Program stations' GPS-derived orthometric heights, specifically in areas where doing extensive leveling observations for constraint purposes is not feasible.

Section 2: Alternative constraint methods may be used in special cases when no valid check connections to NAVD88 heights could be achieved or distances to the nearest NAVD88 heights would require more than 10 km of double run leveling observations or more than three days observing time in unusual circumstances.

Section 3: Field data requirements follow FGCS third order or better specifications and procedures. All efforts should be made to obtain valid check connections to more than one height mod determined NAVD88 GPS derived height.

Section 4: Data submittal to NGS will require error free D-FILE and Blue Book formatted files. Quality assurance checks will be performed on the "Blue Book" files' contents and the adjustment results. No quality assurance checks upon the leveling observations' field books and/or abstracts will be performed.

Section 5: There are currently 51 pre-assigned GPS register numbers which will be used for pre-approval and data submission of level projects. The adjustment procedures will require the adjuster to retrieve a data sheet from the NGSIDB for each verified constraint used and to include the new elevation source code of 'H' on the request for IDB load worksheet. A change to the traditional protocol for retrieving leveling adjustment constraints will include a hierarchical search of the most reliable and accurate NAVD88 height available from the NGSIDB. Guidelines for running the height loading program will be updated to include the additional options for loading these new heights.

Section 6: The Data Sheet needs to be modified to include the new ELEV_SOURCE code of 'H' in its 'best' height retrieval protocol. A new keyword of 'GPS CON' will be included to specify that the published height was determined by a level line constrained to a GPS derived height.